4.7.3 DISPOSITION ALTERNATIVES CUMULATIVE IMPACTS

Implementation of the various proposed disposition alternatives may result in incremental cumulative impacts in addition to the long-term storage cumulative impacts identified in Section 4.7.2. The impacts identified in this section are additive to the cumulative impacts identified in the long-term storage cumulative impact analysis.

A site-specific cumulative impact analysis was not performed for the disposition alternatives, because only representative or generic sites were considered. Instead, a generic cumulative impact analysis that is applicable to all DOE sites was developed for the disposition alternatives. Future tiered NEPA documents will provide detailed site-specific cumulative impact analyses.

Since there are multiple combinations of disposition operations and facilities that could be selected, a representative scenario was used for the disposition cumulative impact analysis. This scenario includes all of the common activities that would be needed for all of the disposition alternatives (pit disassembly/conversion and Pu conversion facilities), the common activity that would be required for the reactor alternatives (MOX fuel fabrication facility), and the immobilization alternative that would generally have the largest impacts (ceramic immobilization facility). For consistency, all analyses assume use of the ceramic immobilization technology. The scenario conservatively assumes that all four of the facilities would be constructed and operated concurrently at the same DOE site. The following sections describe the impacts from the disposition scenario for each resource area.

4.7.3.1 Land Resources

The contribution to land-use cumulative impacts from the disposition scenario is shown in Table 4.7.3.1–1. The construction of all four of the disposition scenario facilities at the same site would disturb up to 191 ha (474 acres) of land during construction, of which up to 133 ha (330 acres) would be used during operations. If all four of the facilities were located at the same site, there would likely be a reduced area of disturbed land due to the sharing of land resources. In addition, optimal use of existing buildings and facilities would occur where possible. The site chosen for the disposition scenario would likely have adequate land area to accommodate the facilities. If the site development is not in conformance with existing land-use plans, it may be possible for land-use plans, policies, and controls to be revised. The use of special status lands and prime farmland could be affected. It is anticipated that the new facilities would be relatively visually unobtrusive to adjacent lands.

Table 4.7.3.1–1. Contribution to Land-Use Cumulative Impacts From the Disposition Scenario

Area of Disturbance (ha)	Pit Disassembly/ Conversion	Pu Conversion	MOX Fuel Fabrication	Ceramic Immobilization	Total Impact
Construction	14	36	121	20	191
Operation	12	28	81	12	133

Source: Section 4.3.1.1; Section 4.3.2.1; Section 4.3.4.2.1; Section 4.3.5.1.1.

4.7.3.2 Site Infrastructure

The contribution to site infrastructure cumulative impacts from the disposition scenario is shown in Table 4.7.3.2–1. The additional resource requirements could require new transmission lines, oil storage tanks, and gas transfer pipelines. Additional fuel oil and natural gas requirements would probably be available using the current procurement practices at the site. If the natural gas requirement is not available, oil-based utilities could substitute. Construction and operation of these facilities would require the construction of transportation links to existing road and rail networks.

Table 4.7.3.2–1. Contribution to Site Infrastructure Cumulative Impacts From the Disposition Scenario[a]

Utility	Pit Disassembly/ Conversion	Pu Conversion	MOX Fuel Fabrication	Ceramic Immobilization	Total Impact
Electrical Energy (MWh/yr)	20,000	21,000	13,000	25,000	79,000
Peak Load (MWe)	5	5	5	3	18
Oil (l/yr)	28,000	39,750	20,000	190,000	277,750
Natural gas (m^3/yr)	3,398,000	4,361,000	2,350,000	3,500,000	13,609,000

[a] Operations only.
Source: Section 4.3.1.2; Section 4.3.2.2; Section 4.3.4.2.2; Section 4.3.5.1.2.

4.7.3.3 Air Quality and Noise

The construction and operation of the disposition scenario facilities would result in the emission of some air pollutants at each of the sites. The modeling needed to determine the concentrations of the pollutants is highly site-specific. The concentrations would vary depending on the ambient conditions of each of the sites. Air pollutant emission sources include exhaust from vehicles, emissions from facility processes, boiler and generator emissions, and fugitive dusts from land clearing and site preparation. Concentrations of criteria and toxic/hazardous pollutants during construction and operation of the facilities may not be in compliance with Federal, State, and local regulations and guidelines.

4.7.3.4 Water Resources

The contribution to water resource cumulative impacts from the disposition scenario is shown in Table 4.7.3.4–1. The disposition scenario facilities would obtain raw water from surface or groundwater sources that currently support the site. Most of the DOE sites analyzed would have adequate water supply to support the proposed projects. Wastewater would be treated using existing treatment, monitoring, and discharge systems. New wastewater treatment systems would be constructed if the current systems do not have adequate capacity.

Table 4.7.3.4–1. Contribution to Water Resource Cumulative Impacts From the Disposition Scenario[a]

Water Resource Requirement (million l/yr)	Pit Disassembly/ Conversion	Pu Conversion	MOX Fuel Fabrication	Ceramic Immobilization	Total Impact
Total water requirement	94.6	80.5	56.8	250	481.9
Total wastewater discharge	85.2	15	43.5	98	241.7

[a] Operations only.
Source: Section 4.3.1.4; Section 4.3.2.4; Section 4.3.4.2.4; Section 4.3.5.1.4.

4.7.3.5 Geology and Soils

Construction of the disposition scenario facilities would involve disturbing up to 191 ha (474 acres) of land. The ground disturbing activities would lead to a temporary increase in the erosion potential of the exposed soils. The disposition scenario facilities are not expected to restrict access to potential geologic resources.

4.7.3.6 Biological Resources

Construction and operation of the disposition scenario facilities could result in the direct disturbance of terrestrial resources, wetlands, and threatened and endangered species. Construction of the disposition scenario facilities would involve disturbing up to 191 ha (474 acres) of land. Less mobile animals within the project area, such as amphibians, reptiles, and small mammals, would not be expected to survive. Construction activities and

noise would cause larger mammals and birds to move to similar habitat nearby. Nests and young animals living within the project area would not be expected to survive. Surrounding areas could be indirectly affected by erosion and sedimentation. The use of existing buildings and previously disturbed areas would reduce impacts.

4.7.3.7 Cultural and Paleontological Resources

The construction and operation of the disposition scenario facilities could affect cultural and paleontological resources. Construction of the facilities could disturb up to 191 ha (474 acres) of land. Cultural and paleontological resources could be affected by ground disturbance, building modification, visual intrusion, audio intrusion, disruption of historic and/or environmental setting, reduced access to traditional use areas, unauthorized artifact collecting, and vandalism. Construction and operation of the facilities could affect Native American and buried paleontological materials.

4.7.3.8 Socioeconomics

The contribution to socioeconomic cumulative impacts from the disposition scenario is shown in Table 4.7.3.8–1. Constructing and operating the disposition scenario facilities would generate employment and income increases in the region. In-migrating workers may be needed to fill specialized positions during construction and operation. Housing units, in excess of existing vacancies, may be required during construction and operation of the facilities. Operation of the facilities would result in an increased demand for community services at the selected site. There may be an increase in congestion on local roads as a result of new traffic from construction and operation workers. Generally, the impacts from the new facilities would be minor relative to the size of the regional population and economy.

Table 4.7.3.8–1. Contribution to Socioeconomic Cumulative Impacts From the Disposition Scenario

Labor Category	Pit Disassembly/ Conversion	Pu Conversion	MOX Fuel Fabrication	Ceramic Immobilization	Total Impact
Direct construction workers	125	358	475	1,000	1,958
Direct operational workers	830	883	500	860	3,073

Source: Section 4.3.1.8; Section 4.3.2.8; Section 4.3.4.2.8; Section 4.3.5.1.8.

4.7.3.9 Public and Occupational Health and Safety

The contribution to public and occupational health and safety cumulative impacts are shown in Table 4.7.3.9–1. During normal operations of the disposition scenario facilities, there would be both radiological and chemical releases to the environment and direct in-plant exposures. However, concentrations are expected to be within regulated exposure limits.

4.7.3.10 Waste Management

The contribution to waste management cumulative impacts from the disposition cumulative impacts is shown in Table 4.7.3.10–1. Existing treatment systems would be used for the wastestreams from the disposition scenario facilities. If capacity or appropriate treatment technology is not available, new treatment facilities would be built to handle the waste from the new facilities.

Table 4.7.3.9–1. Contribution to Public and Occupational Health and Safety Cumulative Impacts From the Disposition Scenario[a]

Receptor	Pit Disassembly/ Conversion	Pu Conversion	MOX Fuel Fabrication	Ceramic Immobilization
Maximally Exposed Individual Member of the Public				
Annual dose (mrem/yr)	1.5×10^{-3} to 1.4×10^{-2}	9.5×10^{-5} to 9.2×10^{-3}	8.8×10^{-5} to 0.015	1.2×10^{-7} to 4.2×10^{-6}
Fatal cancer risk[b]	7.6×10^{-10} to 7.0×10^{-8}	4.8×10^{-10} to 4.6×10^{-8}	7.8×10^{-10} to 1.8×10^{-7}	6.0×10^{-13} to 2.1×10^{-11}
Public Within 80 km				
Annual dose (person-rem/yr)	2.9×10^{-4} to 0.12	1.9×10^{-4} to 0.074	1.4×10^{-4} to 0.14	1.7×10^{-7} to 6.7×10^{-5}
Fatal cancers[b]	1.5×10^{-6} to 6.0×10^{-4}	9.5×10^{-7} to 3.7×10^{-4}	1.2×10^{-6} to 1.2×10^{-3}	8.5×10^{-10} to 3.4×10^{-7}
Involved Worker				
Annual dose (mrem/yr)	200	233	250	279
Fatal cancer risk[b]	8.0×10^{-4}	9.3×10^{-4}	2.3×10^{-3}	1.1×10^{-3}
Total Involved Workforce				
Annual dose (mrem/yr)	83	133	31	120
Fatal cancers[b]	0.34	0.53	0.29	0.46
Hazardous Chemical Impacts				
Maximally Exposed Individual of the Public				
Hazard index	4.0×10^{-6} to 1.5×10^{-4}	7.9×10^{-6} to 1.7×10^{-4}	4.9×10^{-6} to 1.9×10^{-4}	3.9×10^{-4} to 1.5×10^{-2}
Cancer risk[b]	0	4.7×10^{-9} to 1.9×10^{-7}	0	0
Site Worker				
Hazard index	2.6×10^{-4} to 5.3×10^{-4}	8.0×10^{-4} to 1.7×10^{-3}	8.2×10^{-4} to 1.7×10^{-3}	8.3×10^{-2} to 0.17
Cancer risk[b]	0	7.2×10^{-6} to 1.5×10^{-5}	0	0

[a] During normal operations.

[b] Over the operational life.

Note: The impacts projected in this table are for 50t for either immobilization or reactor burning. The pit dissassembly/conversion, Pu conversion, and ceramic immobilization impacts are for 10 years and the MOX fuel fabrication impacts are for 17 years.

Source: Section 4.3.1.9; Section 4.3.2.9; Section 4.3.4.2.9; Section 4.3.5.1.9.

Table 4.7.3.10–1. Contribution to Waste Management Cumulative Impacts From the Disposition Scenario[a]

Waste Category	Pit Disassembly/ Conversion (m^3/yr)	Pu Conversion (m^3/yr)	MOX Fuel Fabrication (m^3/yr)	Ceramic Immobilization (m^3/yr)	Total Impact (m^3/yr)
Transuranic					
Liquid	0	3.2	0	75	78.2
Solid	67	278	306	99	750
Mixed Transuranic					
Liquid	0	0	0	0	0
Solid	4	191	4	0.7	200
Low-Level					
Liquid	4	56	4	7	70
Solid	102	1,743	153	14	2,012
Mixed Low-Level					
Liquid	0.4	0.04	0.8	0	1
Solid	1.7	191	38	0.15	231
Hazardous					
Liquid	2	2	4	38	46
Solid	0.7	11	153	19	184
Nonhazardous (Sanitary)					
Liquid	85,200	15,000	43,300	34,000	177,500
Solid	100	2,060	76	920	3,160
Nonhazardous (Other)					
Liquid	Included in sanitary	56	227	170,000	170,300
Solid	3	0	84[b]	15	102

[a] Operations only.

[b] Includes recyclable waste.

Source: Section 4.3.1.10; Section 4.3.2.10; Section 4.3.4.2.10; Section 4.3.5.1.10.